

ABSTRACT OF THE DISCLOSURE

A method of forming a landed polysilicon plug in a self-aligned contact. A substrate having a plurality of gate electrodes thereon is provided. Before forming the self-aligned contact window, a dielectric liner layer conformal to a surface profile of the substrate and the gate electrodes is formed. An inter-layer dielectric layer is next formed over the dielectric liner layer. High etching selectivity ratio between the inter-layer dielectric layer and the dielectric liner layer is chosen, and thus the dielectric liner layer is used as an etching stop layer in the process of etching out the self-aligned contact window. After a polysilicon layer that fills the self-aligned contact window and covers the dielectric layer is formed, planarization is carried out to form the landed polysilicon plug having a desired thickness.